

## ABSTRAK

Pabrik etilen dirancang untuk memenuhi kebutuhan etilen di Indonesia. Kapasitas yang direncanakan sebesar 60.000 ton/tahun. Pabrik ini beroperasi secara kontinyu selama 330 hari dalam setahun. Pabrik ini direncanakan berdiri di desa Kragan kecamatan Gondangrejo, Kabupaten Karanganyar, Jawa Tengah. diatas tanah seluas 37.975 m<sup>2</sup>. Proses pembentukan etilen dilakukan dalam Reaktor *fixed bed multitube*. Pada reaktor ini reaksi berlangsung pada fase gas, endotermis, isothermal pada suhu 175 °C dan tekanan 1,4 atm, sehingga untuk menjaga suhu reaksi digunakan suplai pemanas berupa *steam*. Untuk memproduksi etilen sebesar 60.000 ton/tahun (7.575,75 kg/jam) diperlukan bahan baku etanol sebesar 13.773,9 kg/jam. Untuk mendukung proses produksi jumlah total air yang di gunakan sebesar 69.372 kg/jam, penyediaan udara tekan sebesar 23,0368 m<sup>3</sup>/jam, penyediaan listrik sebesar 178 kW diperoleh dari PLN dan 1 buah generator diesel sebesar 250 kW dengan bahan bakar solar sebanyak 25 kg/jam dan kebutuhan *fuel oil* untuk *steam* sebanyak 1508 kg/jam. Dari analisis ekonomi terhadap pabrik ini menunjukkan keuntungan sebelum pajak Rp 440.723.048.584 /tahun setelah dipotong pajak 52 % keuntungan mencapai Rp 211.547.063.320 /tahun. Percent *Return On Investment* (ROI) sebelum pajak 24,70 % dan setelah pajak 11,86 %. *Pay Out Time* (POT) sebelum pajak selama 3,1 tahun dan setelah pajak 5 tahun. *Break Even Point* (BEP) sebesar 44,73 %, dan *Shut Down Point* (SDP) sebesar 20,11 %. *Discounted Cash Flow Rate* (DCFR) terhitung sebesar 10,74 %. Dari data analisa kelayakan di atas disimpulkan, bahwa pabrik ini menguntungkan dan layak dipertimbangkan untuk pendirian di Indonesia.

Kata- kata kunci: Etanol, Etilen, Reaktor *fixed bed multitube*

## **ABSTRACT**

*The ethylene plant is designed to cover the needs of ethylene in Indonesia. The plant capacity that had been planned was 60,000 tons/year. This plant would be operate continuously for 330 days in a year. This plant was planned to be established in Kragan vilage, Gondangrejo Subdistrict, Karanganyar Regency, Central Java on an area of 37,975 m<sup>2</sup>. The process of making ethylene is carried out in a fixed bed multitube Reactor. The reaction takes place in the vapor phase, endothermic and isothermal at temperature 175 ° C and a pressure 1.4 atm, so the steam is needed as a heating supply to keep the constant temperature of reaction. To produce the ethylene for capacity 60,000 tons / year (7,575.75 kg / hr), ethanol is needed as much as 13,773.9 kg / hr. To support the production process, total amount of water that needed is 69,372 kg / hr, supply of electricity for 178 kW obtained from PLN and a diesel generator of 250 kW. The fuel that must be available for generator are 25 kg / hr solar, and the need for fuel oil to produce steam are 1508 kg / hr. From the economic analysis of the plant, it shows a pre-tax profit is Rp 440,723,048,584 / year, after tax deduction is 52% profit, it reaches Rp 211,547,063,320 / year. Percent Return On Investment (ROI) before tax 24.70 % and after-tax 11.86 %. Pay Out Time (POT) before tax for 3.1 years and after-tax 5 years. Break Even Point (BEP) is 44.73 % and Shut Down Point (SDP) is 20.11 %. Discounted Cash Flow Rate (DCFR) is calculated at 10.74 %. From the feasibility analysis data above, it was concluded that this factory was profitable and worth considering for the establishment in Indonesia.*

*Keywords: Ethanol, Ethylene, fixed bed multitube reactor*